

Trend Study 25C-6-03

Study site name: Terza Flat.

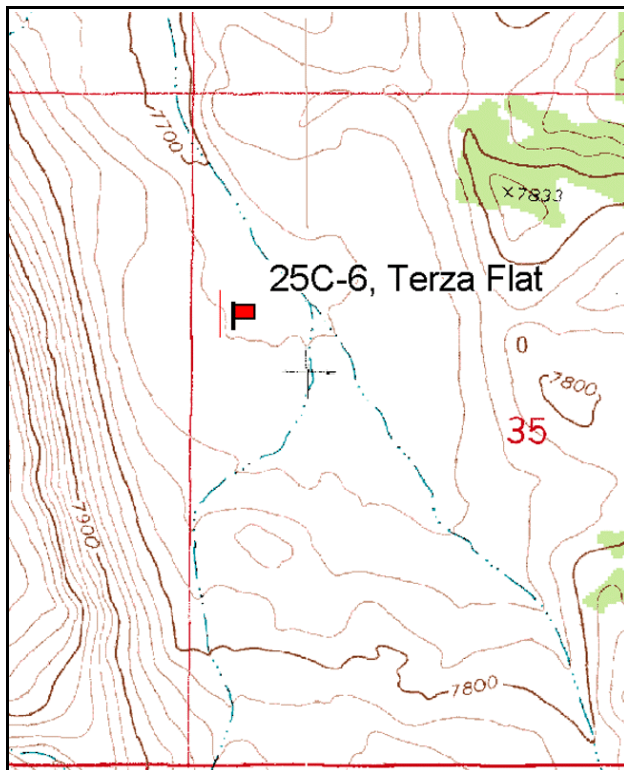
Vegetation type: Wyoming big sagebrush.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

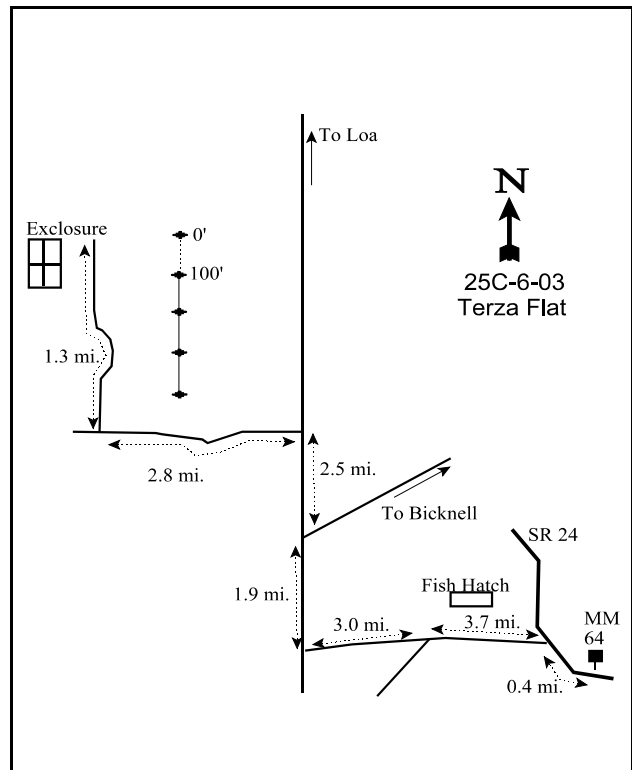
LOCATION DESCRIPTION

South of Bicknell, turn on the road (east) towards Bicknell Fish Hactery. This road is 0.4 miles north of mile marker 64. Travel east for 3.7 miles to a fork, stay right at fork (sign says left is toward King's Ranch). Continue 3.0 miles to an intersection. Turn right (north) and go 1.9 miles to a fork, stay left (straight) for another 2.5 miles to a road going left (west). Drive 2.8 miles to a road going left (north). Take this road for 1.3 miles to an exclosure. Drive to the northeast corner of the exclosure. The 0-foot end of the baseline is 200 feet east of the corner in line with the fence. The 0-foot stake is a fencepost marked by browse tag #7178. The other stakes are marked by rebar.



Map Name: Moroni Peak

Township 29S, Range 2E, Section 35



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4242907 N, 441561 E

DISCUSSION

Terza Flat - Trend Study No. 25C-6

The Terza Flat study is on BLM land which was reportedly the most abused site encountered during the 1985 field season. An experimental exclosure located near the transect contains vigorous stands of winterfat and sagebrush where livestock have been excluded. In contrast, Russian thistle, snakeweed, halogeton, and narrowleaf low rabbitbrush are dominate outside the exclosure. Sheep are allowed to graze the allotment each winter, followed by cattle each spring. Antelope are present in the area year-round. Pellet group data from the site in 1998 estimated 56 antelope/deer, 9 elk and 3 cow days use/acre (138 adu/ha, 22 edu/ha, 7 cdu/ha). Sheep sign was also noted in small numbers. It was difficult to differentiate between antelope, deer, and sheep sign on this site. Rabbits were also present in high numbers. Pellet group data from 2003 estimated 11 antelope/deer days use/acre (26 adu/ha). Only 1 elk pellet group and 1 cattle pat were encountered. A colony of Utah prairie dogs was reported to be present 1/4 mile southeast of the Terza Flat study site in 1985.

The soil is moderately deep with an effective rooting depth of 14 inches. There may be a hardpan between 12 to 18 inches below the surface. Soil texture is a sandy clay loam which is neutral in reaction (pH 7.2). Phosphorus is low at 7.7 ppm, when 10 ppm is considered to be the minimum value for normal plant growth and development. There are a few large rocks on the surface, and erosion pavement is abundant providing 37% cover in 1998 and 35% in 2003. Cover of bare ground is also high, increasing from 29% in 1985 to 44% in 1998. Perennial herbaceous cover is lacking and erosion is ongoing. The erosion condition class was determined to be moderate in 2003. Even with the slight slope, high intensity rain just prior to the 2003 reading caused considerable rills, flow patterns, and soil movement.

This site is dominated by invaders and increasers. Together, the increaser forbs and shrubs made up 88% of the total vegetative cover in 1994 and 77% in 1998. The dominant browse include narrowleaf low rabbitbrush and Wyoming big sagebrush. Winterfat is also an important browse species on the site but plants are small, measuring only 3 to 6 inches in height. Total cover of winterfat has averaged 1/2 of 1% since 1994. Judging from scattered stumps found throughout the area, Wyoming big sagebrush was once the dominant species, but has declined to only 640 plants/acre by 2003. Its patchy distribution has partially contributed to the changes in population between 1991 and 1994 when a larger sample was used to give a better estimate of population density. The Wyoming big sagebrush plants were moderately to heavily hedged in 1991 but more lightly used since. The larger sample used in 1994 also picked up some black sagebrush.

The winterfat population numbered around 1,200 plants/acre in 1994 and 1998. Utilization was heavy in 1991 but more moderate in 1994 and 1998. Use was extremely heavy in 2003, and the short stature of the plants (6 inches) is due to continued heavy use. Density declined to only 460 plants/acre in 2003. Vigor has remained normal on most plants during all readings and percent decadence has been low since 1998. Winterfat is as dense in the livestock exclosure as rabbitbrush is on the outside. Plants are large and vigorous measuring about 12 inches in height. Another preferred browse species, fourwing saltbush, is declining. In 1991, 100% of the fourwing were heavily hedged and all were considered decadent. Density declined by 57% from 932 plants/acre to 400 between 1985 and 1991. Density continued to decline in 1994 and 1998. By 2003 no fourwing was sampled. Fringed sagebrush has followed the same trend. Density has declined from 4,260 plants/acre in 1994 to only 140 plants/acre in 2003.

Narrowleaf low rabbitbrush and broom snakeweed are increasers of little value. Both increased substantially in 1991. Density of rabbitbrush increased to 11,140 plants/acre in 1994 and has remained relatively stable since. Broom snakeweed has fluctuated in density over the years and there may have been some identification problems with narrowleaf low rabbitbrush in 1991.

Composition of the herbaceous vegetation is extremely poor. Halogeton dominates the herbaceous understory. It was noted growing only along the road and was not encountered on the frequency belts in 1985. By 1994, halogeton had spread throughout the site and had a quadrat frequency of 32%. Nested frequency declined significantly by 1998, but halogeton was still the most numerous herbaceous plant on the site. Nested frequency increased significantly in 2003 and cover increased to 7%. Locoweed (*Astragalus* spp.) and one low fleabane were the only other perennial forbs found on the transect. Grasses are rare and only two species were encountered in 1998, bottlebrush squirreltail and Indian ricegrass. Grasses provided less than ½ of 1% cover on the site in 1998. No grasses were sampled in 2003.

1985 APPARENT TREND ASSESSMENT

Although there is a lot of bare soil and pavement exposed, the soil trend is basically stable because of the levelness of the terrain. Vegetative trend is downward. Desirable herbaceous perennials have been almost totally replaced by Russian thistle, an annual. The desirable browse species are being replaced by low-value invaders and increasers. This site should be rested from livestock grazing to allow the vegetative community to heal while there is still seed within the native seed bank for desirable browse species.

1991 TREND ASSESSMENT

The soil trend would have to be considered slightly downward because percent cover for pavement and bare ground have both increased, while litter cover decreased from 35 to only 13%. The more desirable species, Wyoming big sagebrush and winterfat, have contradicting trends. The Wyoming big sagebrush has increased by 39%, up to 3,732 plants per acre, while winterfat has decreased by 36%, now down to only 466 plants per acre. Twenty-nine percent of the winterfat is decadent and is not reproducing. Overall, there was a gain in browse, but low rabbitbrush and broom snakeweed both increased by a remarkably large 62% and 93% respectively. The trend for browse is going down with the large increases for weedy increaser species. There is only one perennial grass, bottlebrush squirreltail, which is quite small and only has a quadrat frequency of 21%. Forbs are mostly weedy invaders. Russian thistle has decreased significantly in nested frequency, which would have to be considered an improvement. However, halogeton has invaded the site and now has a quadrat frequency of 32%. The trend for the herbaceous understory is considered downward and extremely poor.

TREND ASSESSMENT

soil - slightly downward (2)

browse - downward (1)

herbaceous understory - downward (1)

1994 TREND ASSESSMENT

The soil trend now appears to be slightly improving with decreasing values for bare ground and rock cover and a slight increase in litter cover. Density of the key browse, Wyoming big sagebrush, declined from 3,732 plants/acre to 440, while winterfat density increased 58%, from 466 to 1,120 plants/acre. Fourwing saltbush also declined in density from 400 to 200 plants/acre. The larger sample used in 1994 is responsible for most of the changes in density. Shrubs on this site, especially sagebrush, occur in scattered clumps. The new, larger sample better estimates shrub populations which have this type of distribution. With this in mind, the key browse species appear to have stable populations. Wyoming big sagebrush displays lighter use and no decadence. Fourwing and winterfat also show lighter use and improved decadency rates. Increasers, narrowleaf low rabbitbrush and broom snakeweed, appear to have been misidentified during past readings. Combined, these species had a density of 25,264 plants/acre. This high density has declined to 13,760 plants/acre by 1994. These species are widespread over the whole site and density estimates between the old and new, larger sample should be comparable. With all of this in mind, trend for browse is stable. Trend for

the herbaceous understory is stable but with continued dominance by weedy species. Grasses are rare and produced less than ½ of 1% cover. Forbs are also lacking and dominated by halogeton and Russian thistle which provide 99% of the forb cover.

TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is down slightly with an increase in percent bare ground and pavement cover combined with a slight decline in litter cover. Erosion is not a problem however, due to the level terrain. Trend for the key browse species, black sagebrush, Wyoming big sagebrush, and winterfat appears stable. Use of these species is moderate, vigor is good, and decadence low. Fourwing saltbush does appear to be declining however. One positive trend indicator is the decline in abundance of narrowleaf low rabbitbrush and broom snakeweed. Rabbitbrush still has a high number of seedlings and young however. Trend for the herbaceous understory is stable even with a decline in the sum of nested frequency of forbs. Nested frequency of halogeton and Russian thistle have both declined significantly which is an improvement, but there are no forbs or grasses to replace them.

TREND ASSESSMENT

soil - down slightly (2)

browse - stable (3)

herbaceous understory - stable, but poor (3)

2003 TREND ASSESSMENT

Trend for soil is down slightly and in very poor condition. Cover of bare ground has declined slightly but litter cover has also declined by 43% and vegetation cover has dropped slightly. Pavement cover is high and has remained similar to 1998 estimates. There is little protective ground cover on the site and recent rain has caused considerable erosion. The erosion condition class was determined to be moderate in 2003. Trend for browse is down. Density of black and Wyoming big sagebrush combined has declined slightly while percent decadence of both sagebrush species has increased. Fourwing saltbush was not sampled in 2003 and winterfat declined 67% to only 460 plants/acre. Use of winterfat was extremely heavy but vigor remained good. Recruitment was nonexistent however. Narrowleaf low rabbitbrush continues to dominate the site. Trend for the herbaceous understory is also down. No grasses were sampled in 2003 and halogeton increased significantly. It currently accounts for 98% of the total herbaceous cover. Only a few annual forbs were sampled. The nearby enclosure contains a high density of winterfat and little halogeton illustrating that the changes in trend are due primarily to past and present grazing pressure.

TREND ASSESSMENT

soil - down slightly (2)

browse - down (1)

herbaceous understory - down (1)

HERBACEOUS TRENDS --

Management unit 25C, Study no: 6

T y p e	Species	Nested Frequency					Average Cover %		
		'85	'91	'94	'98	'03	'94	'98	'03
G	Oryzopsis hymenoides	-	-	-	2	-	-	.00	-
G	Sitanion hystrix	_b 17	_c 50	_{bc} 41	_{bc} 36	_a -	.44	.39	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		17	50	41	38	0	0.43	0.39	0
Total for Grasses		17	50	41	38	0	0.43	0.39	0
F	Astragalus spp.	8	5	4	-	-	.01	-	-
F	Chenopodium fremontii (a)	-	-	7	-	9	.02	-	.09
F	Chenopodium leptophyllum(a)	-	-	-	-	2	-	-	.01
F	Descurainia spp. (a)	-	-	-	1	-	-	.01	-
F	Draba spp. (a)	-	-	4	-	-	.01	-	-
F	Eriogonum cernuum (a)	-	-	-	-	-	-	-	.00
F	Erigeron pumilus	2	2	-	-	-	-	-	-
F	Halogeton glomeratus (a)	-	_a 74	_{bc} 97	_a 69	_b 120	2.83	1.65	7.03
F	Lappula occidentalis (a)	-	-	-	7	-	-	.01	-
F	Polygonum douglasii (a)	-	-	4	-	-	.00	-	-
F	Salsola iberica (a)	_c 216	_b 41	_b 55	_a -	_a -	1.01	-	-
Total for Annual Forbs		216	115	167	77	131	3.88	1.67	7.14
Total for Perennial Forbs		10	7	4	0	0	0.00	0	0
Total for Forbs		226	122	171	77	131	3.89	1.67	7.14

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 25C, Study no: 6

Type	Species	Strip Frequency			Average Cover %		
		'94	'98	'03	'94	'98	'03
B	Artemisia frigida	50	27	6	.56	.78	.06
B	Artemisia nova	7	8	3	.36	.96	.03
B	Artemisia tridentata wyomingensis	13	15	19	1.05	2.27	2.37
B	Atriplex canescens	9	4	0	-	-	-
B	Ceratoides lanata	29	30	18	.15	.37	.22
B	Chrysothamnus viscidiflorus stenophyllus	78	79	69	7.21	10.93	6.34
B	Gutierrezia sarothrae	25	5	26	.23	.09	.33
Total for Browse		211	168	141	9.56	15.42	9.36

CANOPY COVER, LINE INTERCEPT --

Management unit 25C, Study no: 6

Species	Percent Cover '03
Artemisia nova	.03
Artemisia tridentata wyomingensis	2.61
Ceratoides lanata	.28
Chrysothamnus viscidiflorus stenophyllus	8.75
Gutierrezia sarothrae	.23

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 25C, Study no: 6

Species	Average leader growth (in) '03
Artemisia tridentata wyomingensis	1.1

BASIC COVER --

Management unit 25C, Study no: 6

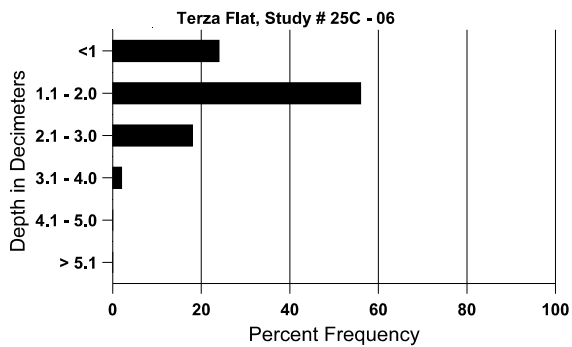
Cover Type	Average Cover %				
	'85	'91	'94	'98	'03
Vegetation	2.50	6.50	13.80	17.43	16.77
Rock	2.50	3.75	6.61	6.38	9.92
Pavement	30.50	38.25	25.40	30.49	34.85
Litter	35.25	13.25	16.29	12.10	6.94
Cryptogams	0	0	.01	.20	.04
Bare Ground	29.25	38.25	33.95	43.59	38.86

SOIL ANALYSIS DATA --

Management unit 25C, Study no: 6, Study Name: Terza Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
13.7	59.0 (15.0)	7.2	50.0	25.4	24.6	1.4	7.7	128.0	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 25C, Study no: 6

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'98	'03	'98	'03
Rabbit	74	64	39	-	-
Elk	4	6	-	9 (22)	1 (2)
Deer/Antelope	20	51	6	56 (138)	11 (26)
Cattle	-	1	-	3 (7)	1 (2)

BROWSE CHARACTERISTICS --

Management unit 25C, Study no: 6

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia frigida</i>											
85	5933	466	600	5333	-	-	0	0	0	0	11/12
91	35799	1200	10133	25400	266	-	5	1	1	.18	4/6
94	4260	-	160	2980	1120	980	0	0	26	18	2/4
98	1320	4240	300	1000	20	-	20	5	2	0	4/6
03	140	-	-	140	-	-	0	14	0	0	4/5
<i>Artemisia nova</i>											
85	0	-	-	-	-	-	0	0	0	0	-/-
91	0	-	-	-	-	-	0	0	0	0	-/-
94	460	-	-	460	-	120	0	0	0	0	12/21
98	360	-	40	300	20	20	39	0	6	0	11/18
03	60	-	-	20	40	-	33	0	67	0	15/24
<i>Artemisia tridentata wyomingensis</i>											
85	2265	2400	1866	333	66	-	0	0	3	0	15/17
91	3732	-	266	3200	266	-	45	16	7	4	9/15
94	440	-	-	440	-	160	9	0	0	0	11/20
98	520	-	60	380	80	20	19	4	15	0	17/29
03	640	-	20	420	200	40	9	3	31	19	21/36
<i>Atriplex canescens</i>											
85	932	-	133	733	66	-	14	7	7	0	12/12
91	400	-	-	-	400	-	0	100	100	100	-/-
94	200	-	-	200	-	-	10	40	0	0	6/6
98	80	-	80	-	-	-	25	0	0	0	-/-
03	0	-	-	-	-	-	0	0	0	0	-/-
<i>Ceratoides lanata</i>											
85	732	-	66	666	-	-	0	0	0	0	5/4
91	466	-	-	333	133	-	29	43	29	14	4/4
94	1120	-	-	860	260	80	36	0	23	9	4/5
98	1380	60	160	1200	20	-	48	20	1	1	3/5
03	460	-	-	440	20	-	0	91	4	4	6/8

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysanthamnus viscidiflorus stenophyllus											
85	1733	533	1000	733	-	-	0	0	0	0	7/11
91	4598	-	1666	2466	466	-	23	4	10	1	8/13
94	11140	660	1480	8920	740	960	0	0	7	3	6/14
98	10920	720	2800	6680	1440	420	.73	0	13	3	8/14
03	9200	-	240	8240	720	240	0	1	8	4	8/13
Gutierrezia sarothrae											
85	1999	-	533	1466	-	-	0	0	0	0	9/11
91	30666	200	4800	25533	333	-	0	0	1	.86	7/10
94	1300	40	20	1060	220	2020	0	0	17	8	5/6
98	120	580	-	120	-	20	0	0	0	0	5/6
03	720	-	-	720	-	-	0	0	0	0	6/9
Opuntia spp.											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
94	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	6/12
03	0	-	-	-	-	-	0	0	-	0	-/-
Rosa woodsii											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
94	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	6/16
03	0	-	-	-	-	-	0	0	-	0	-/-